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HEALTH PHYSICS DEPARTMENT

REPORT FOR MONTH ENDING OCTOBER 31, 1946

K. Z. Morgan

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[REDACTED]

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Per Letter Instructions of

TID-1116

M. Niskey

For: N. T. Bray, Supervisor
Laboratory Records Dept.
ORNL

[REDACTED]

October 31, 1946

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CLINTON LABORATORIES

HEALTH PHYSICS DEPARTMENT

by

E. Z. Morgan

A broom was being used by one of the janitors in the Chemistry Building (706-A) at 8:30 p.m. on 10/11/46 when it was observed that it set off the friskers that are placed around the doorways in several parts of the building. A Health Physics surveyor made some measurements and located a spot on the broom that read 3 roentgens per hour at a distance of 3 inches.

Routine surveys of the Clinton Laboratories' trucks during the past month disclosed that three were contaminated. A high spot on one of 1800 mr/hr was located.

Eight truckloads of radioactive material from Dayton were buried in Clinton Laboratories' burial ground during the month. Some of the trucks read over 500 mr/hr at the tail gate and so arrangements have been made to park the trucks when they arrive at an isolated location where people can not be unknowingly exposed until the radioactive material can be buried.

Clinton Laboratory fire truck, OME 68, has been provided with radiation detection instruments which are to be carried along to fires in the restricted areas.

Extreme care is being taken by persons at Clinton Laboratories who are responsible for the production and shipment of radioactive isotopes to make certain that they are free of undesirable contaminants. As an illustration of necessary precautions, the tellurium that is irradiated to produce iodine-131 should be free of bismuth to prevent the appearance of polonium in the irradiated sample. The absence of this undesirable polonium is assured by making a spectrographic analysis of the tellurium before it is irradiated and by checking the alpha count of the final sample.

An analysis was made by R. D. Cameron of the data collected during the past five months by a continuously recording Geiger-Muller counter located near Solway bridge, eight miles from Clinton Laboratories. The counts were about 5% higher when the wind blew up the valley from Clinton Laboratories toward Solway bridge than when it blew down the valley.

An extensive survey was made of the mud activity in the White Oak drainage system. The results are given in the following table:

(see page 7)

Area of White Oak Lake Surveyed	Approx. Distance below G. L.	Survey in May, 1945		Survey in October, 1945	
		mc/sq.ft.	Total Curies	mc/sq.ft.	Total Curies
Marsh Section	2,120 ft.	91.5	42.7	345.5	67.8
Intermediate Pond	3,250 ft.	87.6	4.6		
W. O. Lake Mud Flats	6,900 ft.	22.0	14.9	9.6	6.5
White Oak Lake	8,600 ft.	8.5	6.8	17.1	13.5
Area below Spillway	10,150 ft.	1.0	0.2	2.7	0.9
Probable Totals			69.3		95

Dr. J. E. Rose in Chicago notified us that a shipment had arrived by truck that had a higher field of radiation in the cab than is usually permitted. An investigation revealed that the boxes had been moved nearer to the cab after they had been surveyed by Health Physics surveyors at Clinton Laboratories and shored by the carpenters in this new position. This mistake will be avoided in the future because the Health Physics surveyors have been instructed to survey truck shipments only when they can see the boxes finally arranged and fastened in place.

A new Chang and Eng, double ionization fast neutron chamber, has been constructed and placed in production by P. W. Reinhardt. This instrument is housed in an 8" x 4" x 3½" aluminum box and weighs only about six pounds. A flux of 25 neutrons per cm² per sec produces a drift of one division per second on the electrometer.

A number of requests have been received for the flow sheet of the Bi PO₄ method of separating plutonium from the urine as developed and used by L. B. Farabee at Clinton Laboratories. This flow sheet is given on page 8.

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FLOW SHEET FOR SEPARATION OF PLATONIUM
FROM HUMAN URINE BY Bi PO_4
PRECIPITATION

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Make 0.20N in HNO_3 . Heat to 65°C . Constant stirring. Make 0.1 M in H_3PO_4 . Add 1.0 gm. Bi (III) solution dropwise.

Stir for $\frac{1}{2}$ hr. at 65°C . Let stand at room temperature overnight.

1500 ml.
Urine

Discard
Supernatant

Siphon off
Supernatant

Bi PO_4 ppt.

Dissolve ppt. in $23\frac{1}{2}$ ml. Conc. HNO_3 cover with watchglass and heat to boiling for ~ 5 min. Add 2 ml. sulfurous acid.

Let stand 20 min. add 1500 ml. H_2O (65°C). Stir and add $7\frac{1}{2}$ ml. H_3PO_4 . Stir for $\frac{1}{2}$ hr. Let stand at room temperature at least 2 hrs.

Discard
Supernatant

Siphon off
Supernatant

Bi PO_4 ppt.

Transfer to 50 ml. cone shaped centrifuge tube.

Discard
Supernatant

Centrifuge

Bi PO_4 ppt.

Dissolve ppt. in $4\frac{1}{2}$ ml. HCl . Build vol. to 12 ml. Add 0.6 mg. La (III). Make 2N in HF .

Discard
Supernatant

Centrifuge

La F_3 ppt.

Add $\frac{1}{5}$ ml. HClO_4 . Fume gently until organic matter disappears. Add $\frac{1}{2}$ ml. Conc. HCl .

Build Vol. to 5 ml. Add 0.4 ml. 6M $\text{NH}_2\text{OH} \cdot \text{HCl}$. Let stand for 20 min. Make 2N in HF .

Discard
Supernatant

Centrifuge

LaF_3 ppt.

Wash one time with 1N HNO_3 - 1N HF .

Discard
Supernatant

Centrifuge

Transfer ppt. to platinum plate

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~~SECRET~~CLINTON LABORATORIESHEALTH PHYSICS DEPARTMENTK. Z. MorganDISTRIBUTION OF EFFORT FOR THE MONTH OF OCTOBER, 1946

<u>Personnel</u>	<u>Monthly</u>	<u>Weekly</u>
Physicists (Assoc., Sr. & Prin.)	9	0
Chemist, Elect. Engr., H.P. Supv., Adm. Asst.	4	0
Jr. Physicists & Research Assistants	23	0
Jr. Chemists	2	0
Laboratorians, Technicians & Clerical	0	32
	<u>38</u>	<u>32</u>

Number of Technical personnel added during month: 2

Number of Technical personnel terminated or transferred: 1

Allocation of time during October in Man-months:Services

Pocket meters	1	7 $\frac{1}{2}$
Badge & ring meters	1 $\frac{1}{2}$	7
Neutron Films	0	1
Hand, shoe & glove counts	0	1
Laundry counting	0	3
Instrument calibration & repair	1 $\frac{1}{2}$	2
Surveys - 100 Area and 706-B	2	0
Surveys - 200 Area	1	0
Surveys - 706-A	2 $\frac{1}{2}$	2
Surveys - 706-C, D	4 $\frac{1}{2}$	1
Surveys - Construction Area	1 $\frac{1}{2}$	0
Mud, Water & Air Surveys	2	1
Radiation Consultant to Army	1 $\frac{1}{2}$	0
Technical Instruction	2	0
Trainees	3	0

Research & Development

Improvement and Development of instruments	2 $\frac{1}{2}$	0
Instrument Tests	1 $\frac{1}{2}$	0
Physio-chemical effects of radiation	1 $\frac{1}{2}$	0
Neutron studies	1 $\frac{1}{2}$	0
Methods of detecting radioactive products in urine	2	1
Preparation of P.P.R.	1 $\frac{1}{2}$	0
Special Problems	1	0
Development of laboratory facilities	1	0
Technical Instruction	1	0
Graduate School	1 $\frac{1}{2}$	0

AdministrativeOffice PersonnelVacations & leaves of absence

	2 $\frac{1}{2}$	0
	0	4
	1 $\frac{1}{2}$	1 $\frac{1}{2}$
	<u>38</u>	<u>32</u>

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